

Thoughts on xTCA Market Forecasting

By Bart Stuck and Michael Weingarten

Bart Stuck (barts @ signallake.com) and Michael Weingarten (mikew @ signallake.com) are Managing Directors of Signal Lake, an early-stage telecom venture capital fund (Westport CT and Boston MA). Signal Lake is an investor in CorEdge Networks, a leading ATCA/MicroTCA startup.

Conventional wisdom says that ATCA and MicroTCA will become major markets in a few years. In support of this, different high tech analysts periodically come out with forecasts that show multi-billion-dollar market size 2-3 years out, growing rapidly to an even larger single-digit billion dollar number five years out.

The problem with these forecasts is that so far, they have been wrong. Despite early optimism, the market for xTCA (ATCA and MicroTCA) is not at a multi-billion dollar level. Instead, we keep seeing new forecasts each year, which look suspiciously like last year's numbers moved ahead by one year. When this happens several years in a row, skepticism naturally takes over.

So with that as background, are there valid reasons for optimism? If so, what are reasonable forecasts for growth going forward?

As people who have been around the block a few times but who are not part of the high tech forecasting fraternity, we thought that it would be useful to start fresh and think about what we see happening.

1. Underlying Market Drivers

First of all, let's start with the value proposition for xTCA. In a word, it's all about *substantial savings for end customers*. In previous [BCR](#) articles ("The Impact of ATCA on Telecom Economics," December 2005; "Micro (and Pico)TCA: Setting the Standard for Less Expensive Carrier Gear," October 2006), we have emphasized the magnitude of the potential savings for end customers by adopting open-platform standards:

- Proprietary telecom and computing equipment sells at around a 70% gross margin. In contrast today's open-platform PCs sell at 20% gross margins. Assuming equivalent cost, this translates to a 50% reduction in end customer price.
- With component standardization via xTCA, there will be resulting economies of scale that will lower unit costs, and with it, will drive end customer prices even lower.
- Since xTCA equipment will employ standardized chassis, power supplies and controllers, when customers want to upgrade their networks, they can swap out Advanced Mezzanine Cards (AMCs) without forklift replacement of their existing racks of equipment, saving even more money.

For *key vendor constituencies*, there also are substantial reasons for adopting xTCA.

- For chip vendors like Intel or Broadcom, the opportunity to substitute merchant chips in place of the proprietary ASICs (populating Cisco and Juniper routers) makes xTCA an attractive growth opportunity:

- For *traditional telecom vendors* (i.e., Ericsson, Lucent Alcatel, Nokia Siemens, Nortel), adopting open platforms and differentiating themselves with proprietary software solutions is a good way to maintain/gain share at the expense of vendors like Cisco selling proprietary solutions.
- For *major new entrants and/or contract manufacturers* (i.e., Huawei, ZTE, Foxconn, Flextronics, Celestica), open-source platforms is a logical extension of what they have been doing in the PC or telecom markets already

So in a nutshell, the driving forces behind xTCA in telecom is an alliance virtually everyone important in the telecom ecosystem, arrayed against proprietary players (mainly Cisco, IBM Data Center products and Juniper). Given the power of Cisco and IBM, one cannot blithely assume that they will lose out. However, the inherent economic power and technical savvy of a small number of large telecom equipment buyers, we believe that even these companies will need to make xTCA-compatible equipment, if they want to keep selling into this market.

2. Addressable Market

The overall telecom market is in the \$100B-\$150B. That's really big, and it's probably growing a couple of percent a year (post bubble nuclear winter). Even 2% growth on \$150B adds \$3B per year in year 1, and it gets bigger from there.

The question then is how large is the addressable market for xTCA? Not all of it, because there always is going to be proprietary equipment sales (if for no other reason than replacements and upgrades). There also will be revenues for competing open-standards such as VME and Compact-PCI.

So how big an opportunity for xTCA? Given our belief that:

- Some form of xTCA will be ideal for edge as well as core applications
- There is substantial market support for xTCA by major customers and vendors,

we believe that the answer is going to be some double-digit amount (i.e., somewhere between 10% and 90% of the overall market). Given that even a 10% market share on a \$150B market will mean a \$15B addressable market, the addressable market will be large. And having said that the range is 10-90%, we think that 10% would be conservative. In our own minds, we tend to think in terms of two scenarios, 33% at the low end, 67% at the upper end. That would make the lower end addressable market approximately \$50B (not including the 2% annual growth we talked about).

3. Penetration Rate (Conceptual)

When we speak of penetration rate, we are talking at the rate at which xTCA will actually penetrate the addressable market. It won't happen right away, and it certainly won't happen in the 5 years used by all high-tech forecasters – particularly given the long development cycles for production equipment used in telecom. It also won't happen in a straight-line annual percentage growth rate.

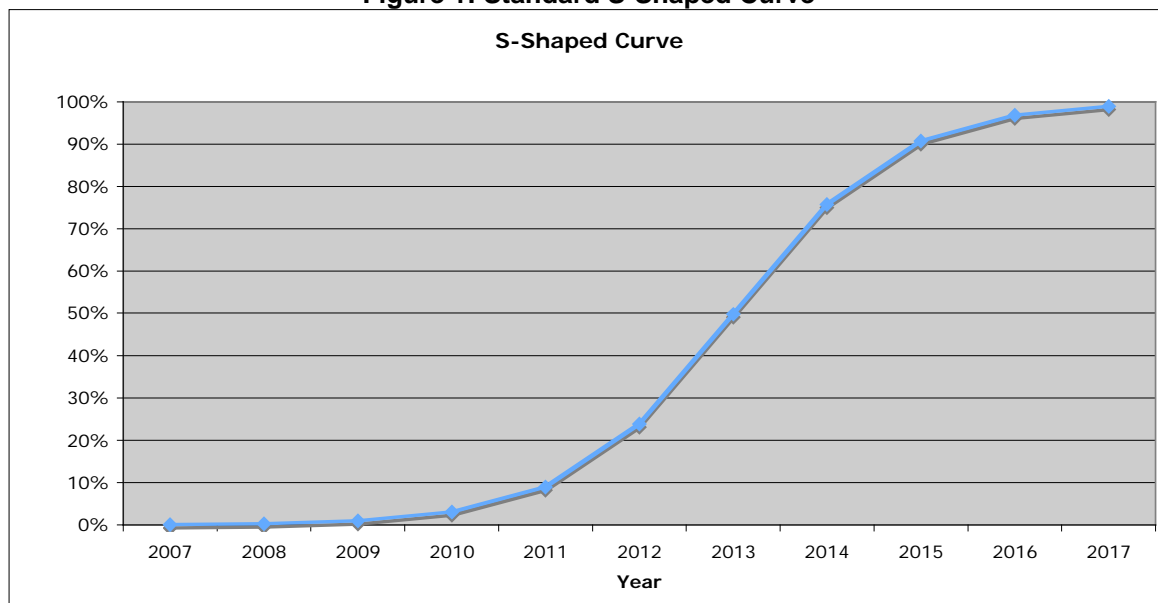
Instead, what we're really talking about here is a classic S-shaped penetration curve, of the type made famous a few years ago by Geoffrey Moore in Crossing the Chasm.

- At the beginning of the growth cycle, a few *innovators* will play around with the new technology, because they buy into the long-term value proposition and they probably work in R&D departments anyway, where they get paid to play with toys. At that point, the market potential will be miniscule.

- Next, there is the *early adopter* stage, where a small number of pro-technology companies start developing pre-production beta prototypes for testing at customer sites. At this stage, the market will still be relatively small, because you don't need that many units to support beta testing.
- Next, there is the *early majority* and *late majority* stages when the technology gets deployed for serious production applications. This is when real dollar growth occurs.
- Finally, there is the *laggard* stage, where the last elements of market penetration get achieved.

In any S-shaped penetration curve (see Figure 1 for a 10 year substitution curve), one sees a period of slow penetration growth (during the innovator/early adopter phases), followed by a period of rapid penetration growth (during the early majority and late majority phases), followed by a renewed period of slow penetration growth as the market reaches maturity.

Figure 1: Standard S-Shaped Curve



4. Penetration Rate Forecast

If we think that the answer is going to be an S-shaped curve, how do we go about predicting it? Looking at the high tech forecasting community (who only look at the next 5 years), they rely largely on a bottom-up compilation of interviews with major vendors and customers. The problem with that approach is that at a big company like Ericsson or Nokia Siemens, no one person really has a handle on what's going on. The early adopters likely will be in the R&D labs, while the early/late majority adopters will be in product planning or even purchasing. If you ask the purchasing people what their plans are for MicroTCA right now, the answer is that they probably don't know. So you end up thinking that because you have some survey results, you have hard information when you really do not.

Given that we have neither the time nor the interest in doing our own survey work, we've taken a distinctly different approach. As it turns out, one of our authors (Weingarten), who for many years was a strategy consultant (first at Boston Consulting Group and more recently at Monitor), has substantial experience dealing with S-curve forecasting in a variety of industries, ranging from the growth of large poultry and hog farms to consumer electronics products. From this, he has found that empirically, most S-curves follow the same rule:

- If you calculate at any point in time the ratio of the percentage of the addressable market that has substituted (f) to the percentage of the market that has not substituted ($1-f$), you will find that this $f/(1-f)$ ratio will tend to increase by a consistent annual percentage increase.
- If you apply a constant percentage growth rate to the $f/(1-f)$ ratio, you will end up with a perfect S-curve.

5. Creating Two S-Curve Scenarios

Using this methodology, we developed two scenarios:

- \$150B total market growing 2%/year for 10 years; 33% addressable market with 80% penetration by year 10; initial \$100M market size; steady $f/(1-f)$ growth rate over a 10 year period
- Same as Scenario A, but 67% addressable market

6. Results: Market Penetration % of Addressable Market

Figure 2 shows the resulting market penetration rates (while figure 3 shows the earlier years in expanded scale). The results show that over the next five years, we will be seeing single digit penetration, with much of the growth occurring after 2012.

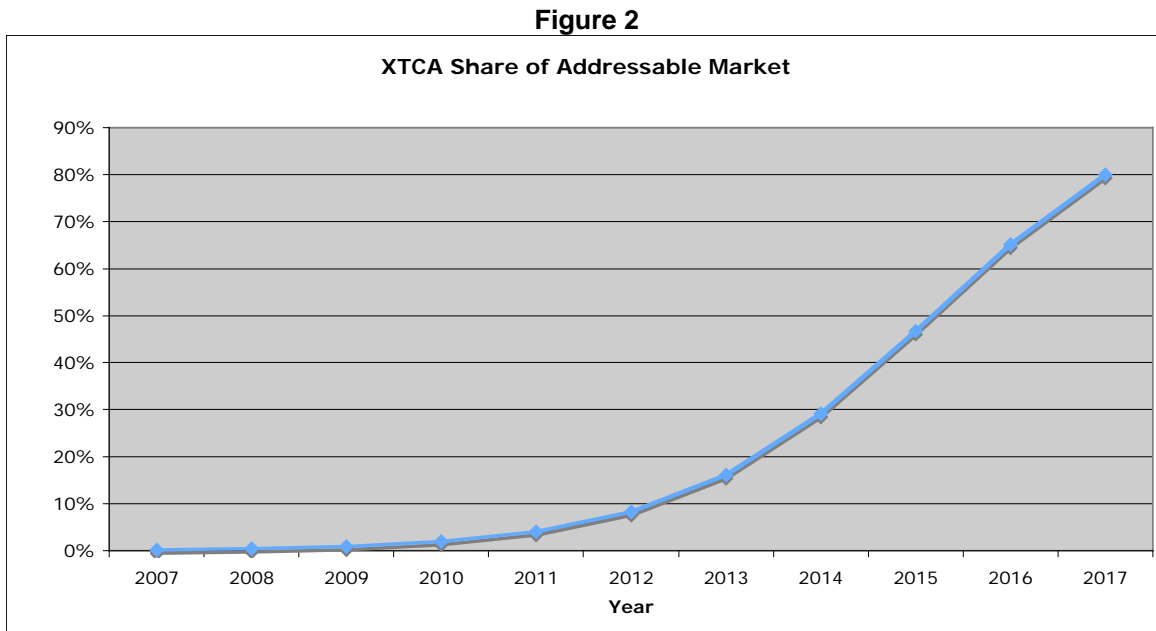
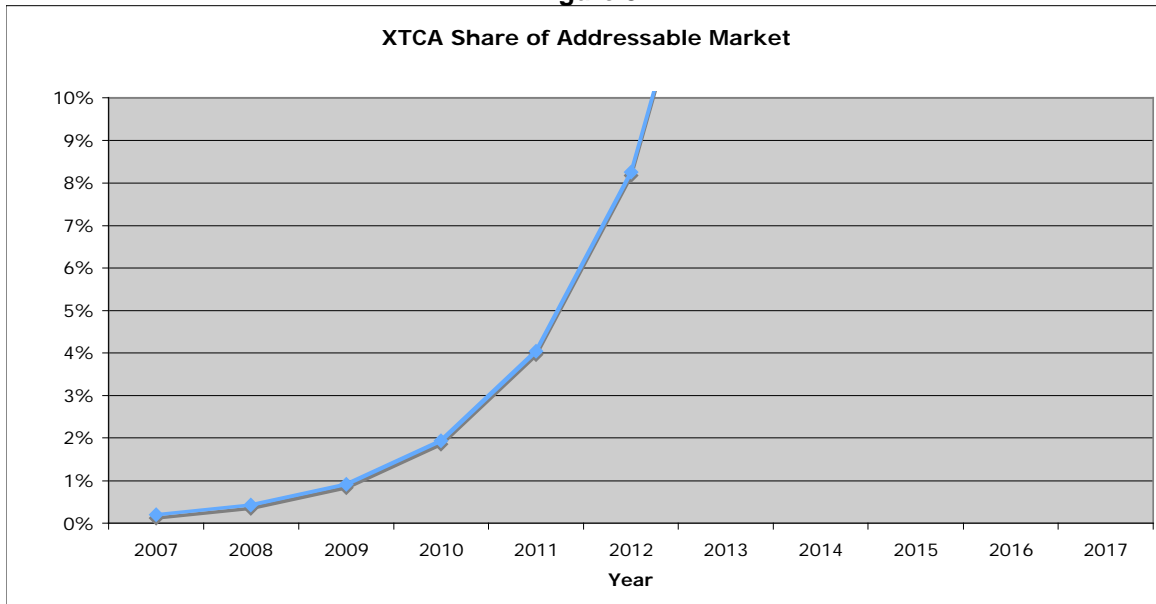


Figure 3



6. Results: xTCA Market Size (\$Millions)

Figure 4 shows the forecasted xTCA market size in millions of dollars (while figure 5 shows the earlier years in expanded scale). The results show that by 2012, we will be seeing a market size of \$4.5B-\$6.5B, growing to \$50B-\$100B in ten years.

Figure 4

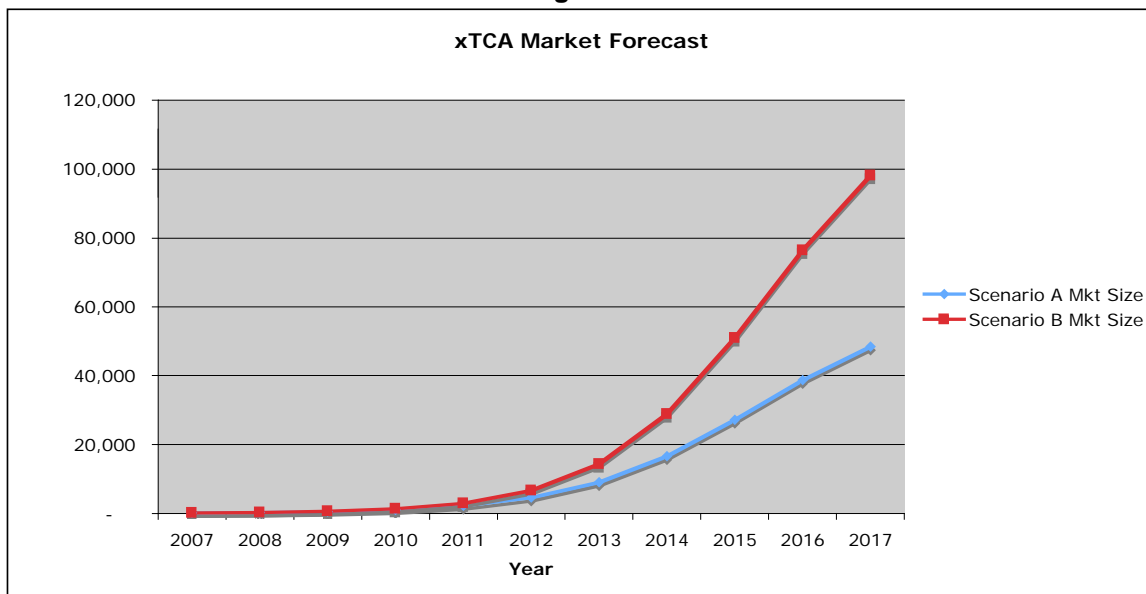
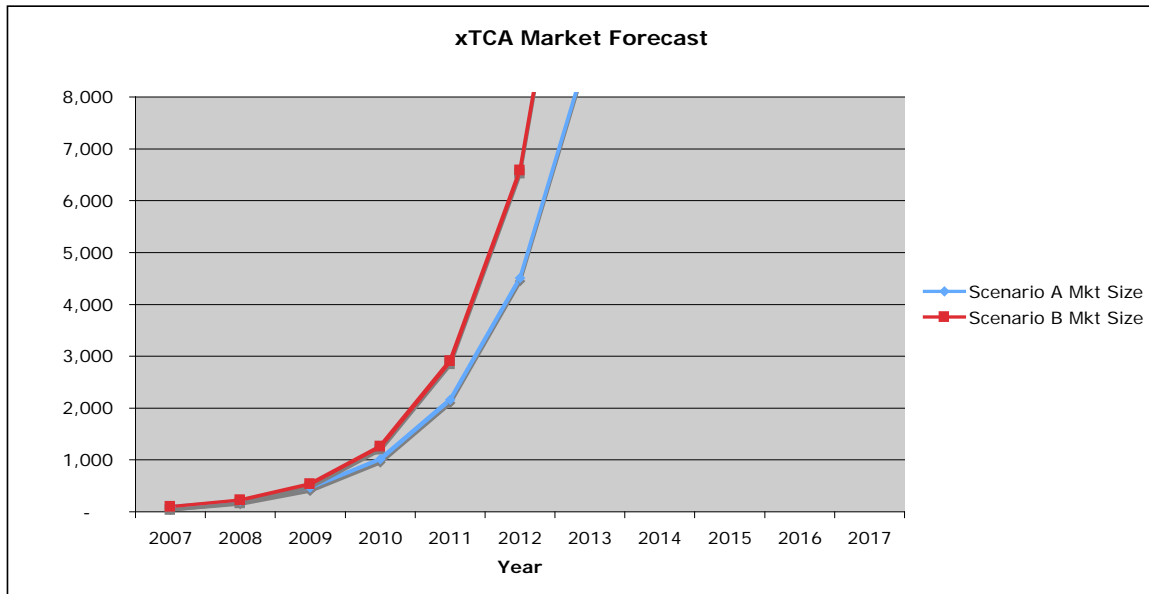


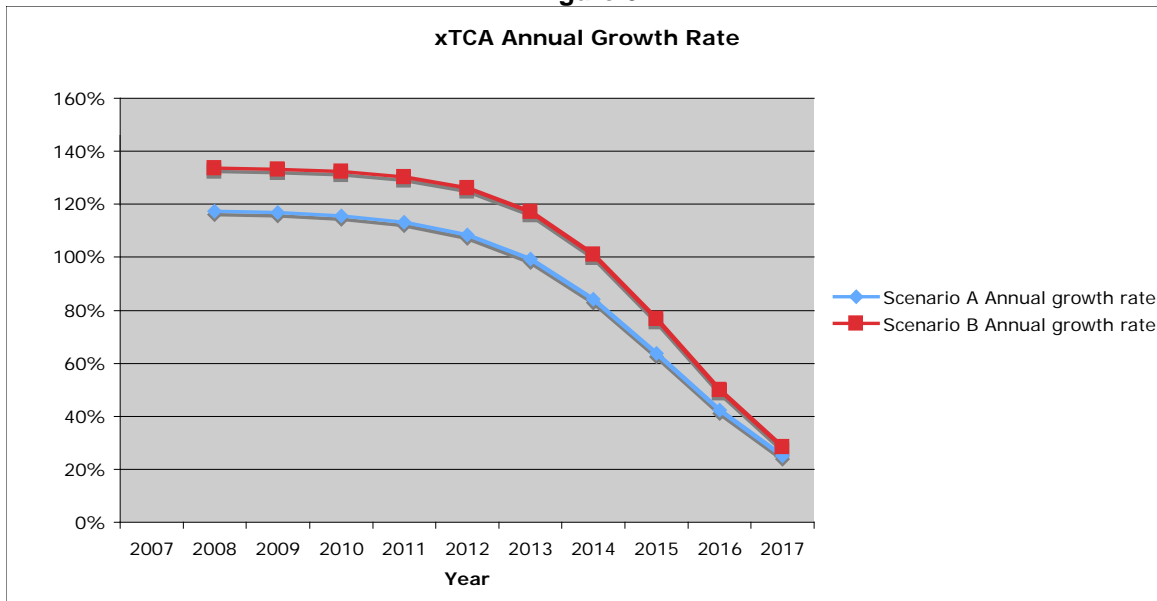
Figure 5



7. Results: xTCA Annual Growth Rate

Figure 6 shows the annual percentage growth rate for revenues by year. Since we are suggesting penetration of a major addressable market starting with a small base, the early year growth rates are in the 120%-140% range. Essentially, what this suggests is that for a five year period, the market size will *more than double each year*. After that, the growth rate slows down to a mere 20-80% annual growth. Not too shabby!

Figure 6



Conclusion: Tracking Against The Real World

Based on the above, we believe that ultimately, the xTCA market is going to be extremely large – particularly in the years after 2012. For it not to be very large, one would have to believe that the addressable market is very small, which is unlikely.

For the nearer term (under 5 years), our methodology suggests to us that, like our research analyst colleagues, we are likely to be seeing a market that is in the low single digits of billions of dollars. That is the way S-curves work. It takes time to generate the market momentum for wholesale market majority adoption.

How does this match what we're seeing in the marketplace? Just in the past few months, we have been seeing an increasing number of people beginning to develop MicroTCA prototypes. We also know of at least one major telecom systems vendor that is doing customer site testing for MicroTCA-based systems, with possible initial production 18 months out. That suggests to us that we are moving from Moore's innovator stage to the early adopter stage. So we're comfortable directionally with the numbers we're showing on figures 3 and 4.

What that says to us is that if you want to be a player in the telecom world, you will ignore xTCA at your peril.